ArcIMS 3 Features and Functions

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ArcIMS 3 Features and Functions

One of the key features of ESRI's new Internet mapping system, ArcIMS™ 3 software, is the ability to establish a common platform for exchange of Web-enabled geographic information system (GIS) data and services. ArcIMS is more than just an Internet mapping solution—it is a framework for distributing GIS capabilities via the Internet. As a publishing technology, ArcIMS features unique capabilities for supporting a wide variety of ESRI® clients. As a serving technology, ArcIMS includes a wide variety of ESRI serverside technology and provides a unique data integration potential via certain clients.

ArcIMS Architecture

Specifically built to serve GIS on the Internet, ArcIMS is designed to make it easy to create map services, develop Web pages for communicating with the map services, and administer sites.

ArcIMS operates in a distributed environment and consists of both clientside and serverside components. Typically, the client requests information from an Internet or Intranet server. Then the server processes the request and sends the information back to the client viewer.

The ArcIMS server technology is part of a multitier architecture. The ArcIMS framework consists of clients, services, and data management. The wide variety of supported clients and the server potential are what sets ArcIMS apart from other Internet GIS competitors. The clients that ArcIMS supports and the serverside capabilities are unparalleled by any other solution. The server side includes core services. More services will be added in the future.

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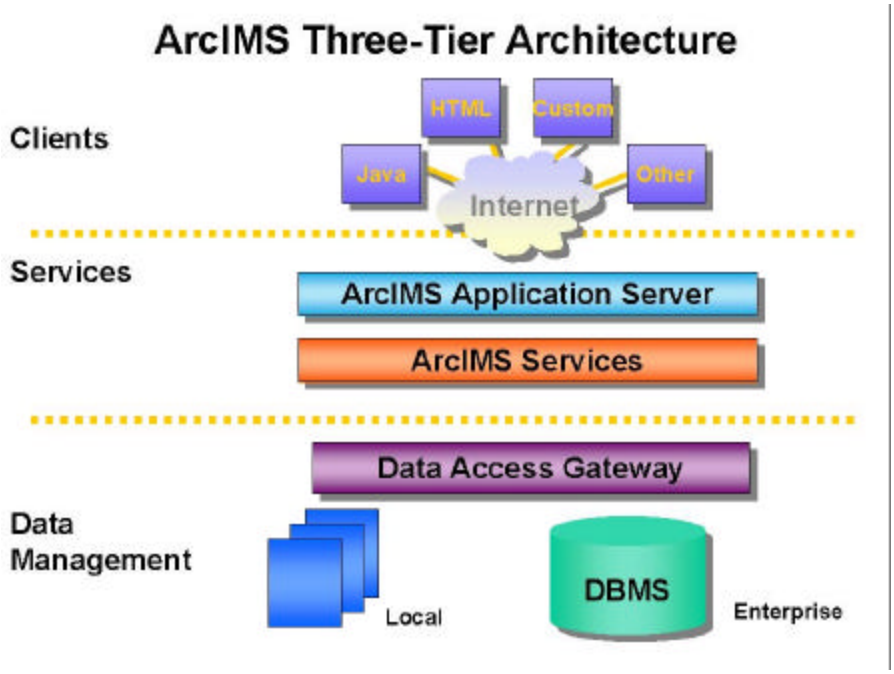

Serverside Components

The ArcIMS serverside components include

- ArcIMS Spatial Server
- ArcIMS Application Server
- ArcIMS Application Server Connectors
- ArcIMS Manager

ArcIMS Spatial Server

The ArcIMS Spatial Server processes requests for maps and related information. When a request is received, the ArcIMS Spatial Server performs functions such as

- Creating cartographic map image files
- Streaming map features
- Searching to query the database
- Geocoding for address matching operations
- Extracting or "clipping" data to create a subset that can be sent back in shapefile format

Two middleware processes run in the background to support the ArcIMS Spatial Server, the ArcIMS Monitor and the ArcIMS Tasker. These can operate as either Windows NT services or daemon processes (on UNIX).

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ArcIMS Application Server

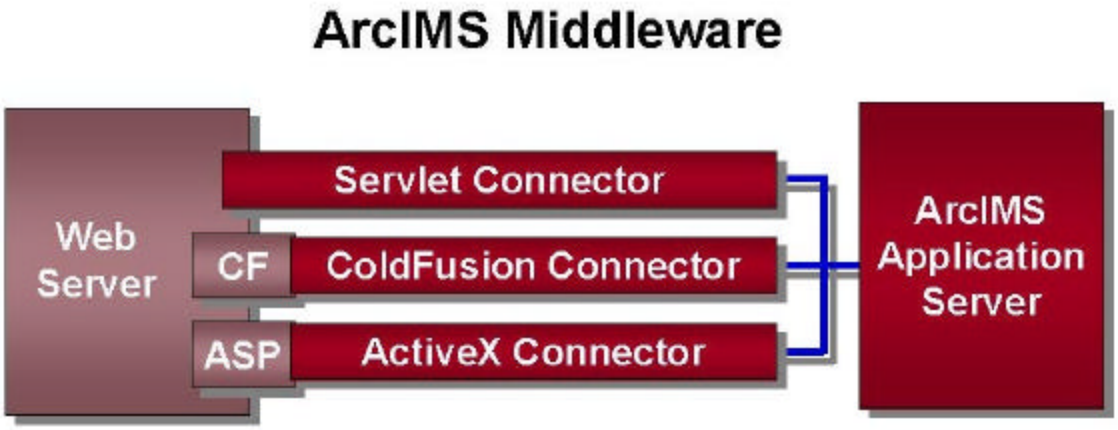
The ArcIMS Application Server handles the load balancing of incoming requests and tracks what MapServices are running on which ArcIMS Spatial Servers. The ArcIMS Application Server passes a request to the appropriate spatial server. The application server is written as a Java application and runs as a Windows NT service or a daemon process (on UNIX).

ArcIMS Application Server Connectors

The ArcIMS Application Server Connectors are used to connect the Web server to the ArcIMS Application Server. ArcIMS provides three connectors:

- Servlet Connector
- ColdFusion Connector
- ActiveX Connector

The Servlet Connector is the standard connector used for ArcIMS. It uses the ArcIMS language, ArcXML, to communicate from the Web server to the application server. ArcXML is the ArcIMS version of eXtensible Markup Language (XML). The ColdFusion and ActiveX connectors work with custom clients and translate their own languages into ArcXML.



ArcXML

ArcIMS communicates between the different components using ArcXML. These ArcXML files look similar to HTML pages. The difference is that HTML describes the page structure for display while ArcXML provides the structure for describing the content.

ArcXML tags and attributes provide the structure for

- MapService configuration files. These files describe how a map should be rendered including the list of layers that are used and how each layer should be symbolized.
- Requests. Requests set a filter on an existing MapService configuration file that specifies which part of a map and associated data will be acted upon.

- Responses. Responses send the information back to the client.

ArcXML defines content for MapServices and is used for requests and responses between clients, middleware, and server.

Clientside Components

In-the-box ArcIMS includes HTML and Java clients, plus supports a full suite of other ESRI clients such as ArcExplorer™ and ArcPad™ software and other devices. The ArcIMS Java and HTML client viewers process data on the client machine, performing many tasks without further interaction with the server. Users can also develop custom desktop applications using the ArcIMS connector interface. Users can build custom Visual Basic and Visual C++ applications that use ArcIMS services.

Requests are sent from three types of ArcIMS Viewers:

- HTML/DHTML Viewers that send requests directly using ArcXML
- HTML/DHTML Viewers that use the ArcIMS ColdFusion or ActiveX Connectors
- Java Viewers including ArcExplorer 3 (Java Editor)

ArcIMS includes clientside viewers:

- ArcIMS HTML Viewer
- ArcIMS Java Viewer

The ArcIMS Viewers determine the functionality and graphical look of the site. Users can customize templates to add logos, graphics, colors, and functions. This is the map view that will be displayed in the end user's Web browser.

With the ArcIMS architecture, new, more powerful clients process "smart data" on the client machine to instantly perform many tasks without having to interact with the server. The ArcIMS Viewers offer tools for viewing and querying spatial and attribute data, performing spatial analysis tasks such as selecting and buffering features, and sharing ideas about data with others using such tools as Edit Notes and Map Notes.

Using the ArcIMS Viewers, you can

- Pan and zoom the map extent.
- Query spatial and attribute data.
- Create a buffer around features.
- Measure distances on your map.
- Add Map Notes, such as text, graphics, or images, to your map and submit the Map Notes to an ArcIMS site for review.
- Make Edit Notes to map spatial and attribute data and submit the edits to an ArcIMS site for review.

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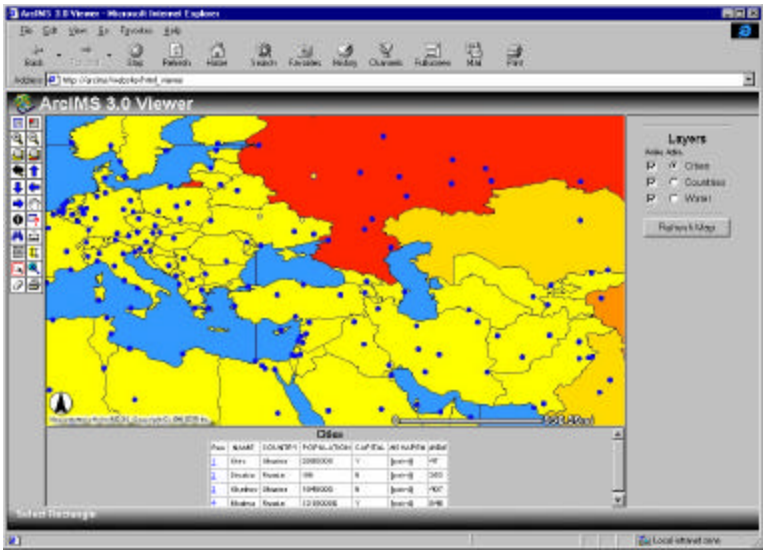
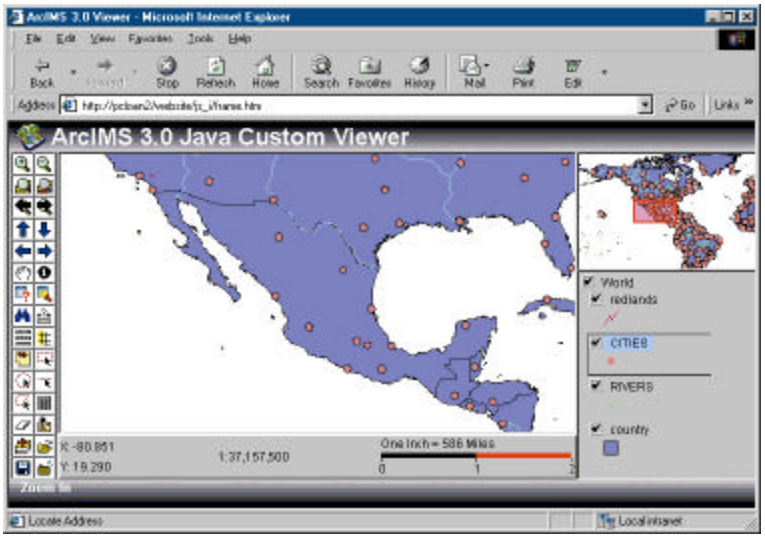
- Locate an address.

The ArcIMS Viewers also feature legend, overview maps, saving and retrieving projects, and map printing.



HTML Viewer

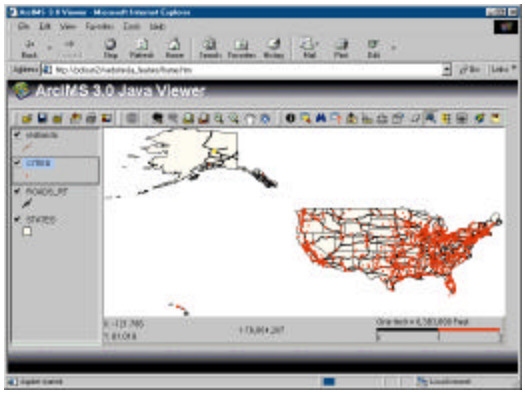
The Overview Map button and Legend/Layer List button are unique to the HTML Viewer. Toggle between the layer list (as seen in this example) or a legend that shows the symbology for each layer.



Java Custom Viewer

This viewer allows users to serve Image and Feature MapServices. The legend shows an Image MapService named World. The Image MapService has three sublayers: country,

cities, and rivers. In this example, the cities sublayer is active (the active layer appears raised in the legend). Feature streaming serves information to a client browser in a specially optimized compressed format—resulting in true client/server processing capabilities.



Java Standard Viewer

The Viewer Elements button is unique to the Java Standard Viewer. It allows users to control the display of the overview map, legend, and scale bar and the setting of the scale bar properties.

ArcIMS Viewer Comparison Chart

Feature	HTML Viewer	Java Custom Viewer	Java Standard Viewer
Pan and zoom the map	x	x	x
Identify and find features	x	x	x
Search for features	x	x	x
Query data	x	x	x
Display Map Tips		x	
Select and buffer features	x	x	x
Work with measuring distances and scale bar units	x	x	x
Add Map Notes		x	x
Use Edit Notes*		x	x
Locate an address	x	x	x
Open layer properties*		x	x
Change layer properties	x	x	x
Add data	x	x	x

* Not available with Image MapServices.

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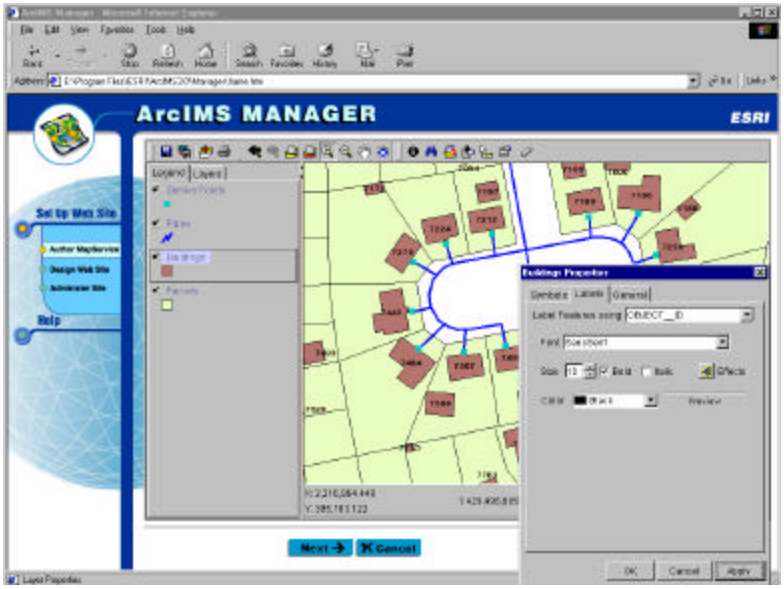
ArcIMS Manager

The easy-to-use ArcIMS Manager is a suite of Web pages that provides access to all ArcIMS serverside functions and tools. Through the ArcIMS Manager, users can quickly set up and administer Internet services. Simple instructions guide users through the steps of authoring, designing, and publishing map services.

The ArcIMS Manager consists of three stand-alone components to

- Author MapService files.
- Design Web pages.
- Publish MapServices and administer ArcIMS Spatial Servers.

The ArcIMS Manager combines these applications—the ArcIMS Author, ArcIMS Designer, and ArcIMS Administrator—into one wizard-driven framework. Although each of these processes is available as an independent application that runs outside a Web browser, the ArcIMS Manager provides the transitional steps for additional communication among the components.

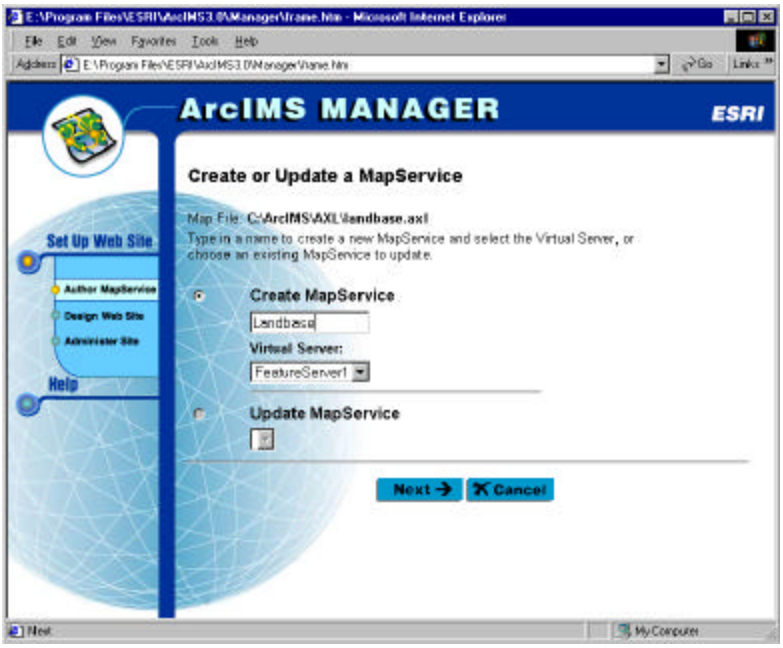


The ArcIMS authoring and site administration tools provide an easy-to-use site management environment such as a console for starting and stopping map services, as well as a screen for viewing performance statistics on serverside distribution. In addition, tools can be distributed to various administrators and can be run in a combined browser interface or as stand-alone Java applications. The ArcIMS Manager resides on the Web server computer and can be accessed remotely to administer a site.

Authoring MapService Files

The ArcIMS Author allows users to define the mapping application content. Generating an online map involves adding data content and setting other map properties that create a MapService. A MapService allows the content of a map configuration file to be

published on the Internet and sets the framework for the Web site functionality. The output from the ArcIMS Author is a map configuration. This file can also be edited in a text editor independent of the ArcIMS Author environment.



The ArcIMS Author is a menu-driven applet that steps users through the map content definition process. Internet maps can be created using shapefiles, ArcSDE™ data sets, and images. The ArcIMS Author allows users to define connections to databases, symbology, and other mapping parameters. Use the ArcIMS Author to

- Compile data sources as layers.
- Render polygons.
- Set scale-dependent rendering.
- Set up query and geocoding functions.
- Add text labels to describe map features.

The ArcIMS Author allows users to create a map configuration file, which is written in ArcXML. The map configuration file is the input to a MapService. The ArcXML file specifies how data will look, what labels will be available, and how different types of data are displayed.

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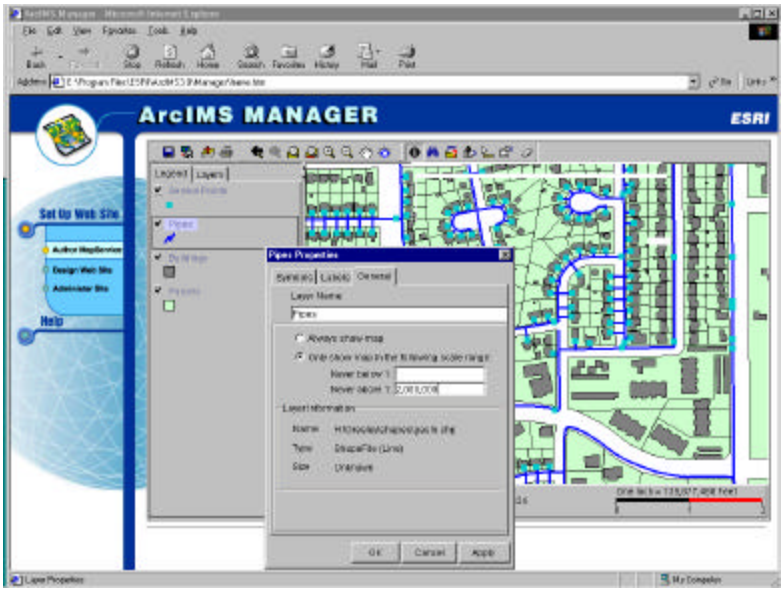
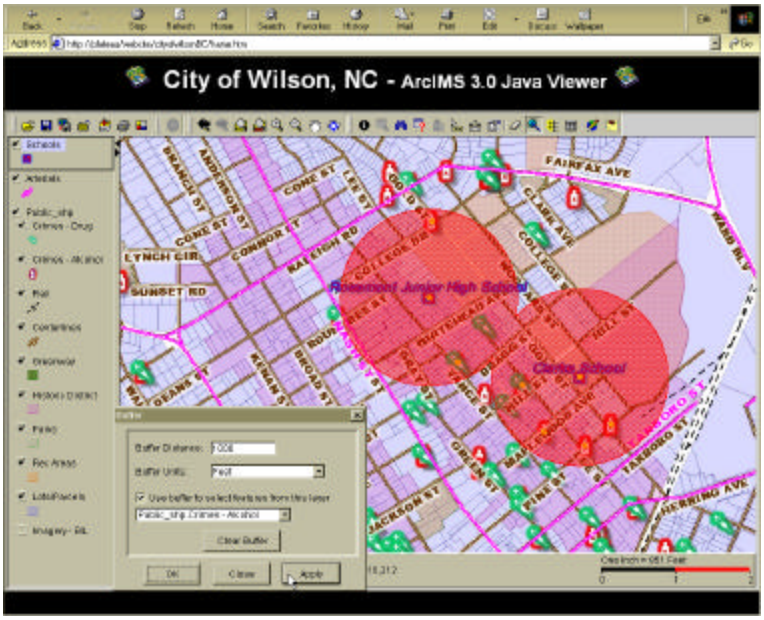


The ArcIMS Author includes features for setting scale dependencies so that a map renders the appropriate amount of detail at a given scale.

Designing Web Pages

Based on the data defined in the ArcIMS Author, the role of the ArcIMS Designer is to generate the Web service that the end user will view. The ArcIMS Designer leads its users through a series of panels including selection of MapServices, templates, and the operations and functions that will be available to the client Web browser.



A Web site is more than a MapService. It can include a legend, a toolbar for navigating the map, a scale bar, and a thumbnail overview map. The Web site also puts a certain graphical look and feel around the MapServices.

After deciding whether the client site will be an HTML Viewer, a customizable Java Viewer, or a noncustomizable Java Viewer, the ArcIMS Designer guides the user through a series of Web pages.

Through the ArcIMS Designer, the end user experience is defined. The ArcIMS Designer lets the user define whether to allow query, editing, Map Notes, Edit Notes, or data integration functions. The ArcIMS Designer takes the user through the steps of creating a Web site and MapService, defining the page elements, map extent, visible layers, and overview map as well as setting features such as the scale bar. With the ArcIMS Designer, users can also select toolbar functionality from a predefined menu of options.

The output from ArcIMS Designer is a series of HTML pages that guide the user through the design process of building an ArcIMS Viewer—a combination of MapServices with toolbar functions. The Web pages can be used out of the box, or they can be customized to meet specific needs.

Administering MapServices

The ArcIMS Administrator console controls the operation of the Web mapping site. The administration tools allow users to manage MapServices, servers, and folders. With the ArcIMS Administrator, users can

- Add and reconfigure ArcIMS sites.
- Perform load balancing.
- Manage ArcIMS Spatial Servers.
- Assign tasks to servers.
- Monitor client and server communication.

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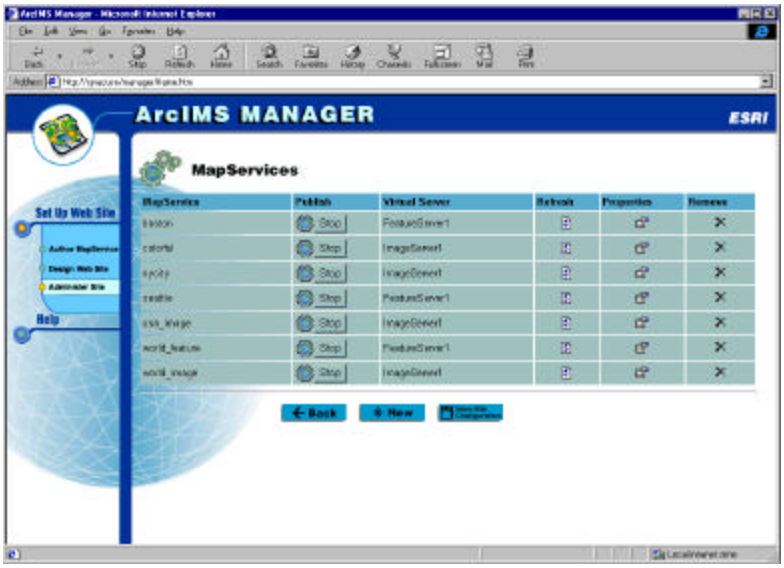
- Automatically update Web site configuration.
- Compile statistical information.

ArcIMS is specifically designed so that the site will continue to function while servers and services are added and removed. A site configuration can be saved so that it will automatically restart with the same configuration.



The goal of site administration in ArcIMS is to manage these components to create a system that supports the distribution of maps and GIS functionality on the Internet.